

SPACE PROPULSION SYMPOSIUM (C4)  
Electric Propulsion (4)

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NON CONVENTIONAL ELECTROD CONFIGURATION IN ELECTROGASDINAMICS TESTS.

**Abstract**

We present a series of trials with high voltage sources in order to produce cold plasma, ionization and ultimately electric wind . This phenomenon is used to accelerate the boundary layer in order to energize it and hence improve the aerodynamic qualities of a vehicle. Firstly, tests were performed using a static bench for measuring the force generated by different electrode configurations and different combinations of high voltage sources, in order to detect the maximum thrust, and thus reduce the use of wind tunnel hours. In all cases it was decided to test exposed electrode configurations (BED) which are easier to implement on aircraft wings because minimal required modifications. However, the classical electrode-emitter configuration was discarded (BED); instead the three electrode configurations connected to separate power supplies in both transverse to the flow and in the same directional sense, which we call TEBD (Tree Electrodes Bored Device), was adopted. In all cases studied the measured values of voltage, current, and thrust obtained in static benches testing, were plotted, as well as air velocity PIV (Particle Image Velocimetry) measurements. Wind tunnel tests smoke visualization are shown, by means of which the flow behavior, for maximum thrust setting as identified in the static tests with voltage activation, can be compared to the flow resulting without voltage activation.